

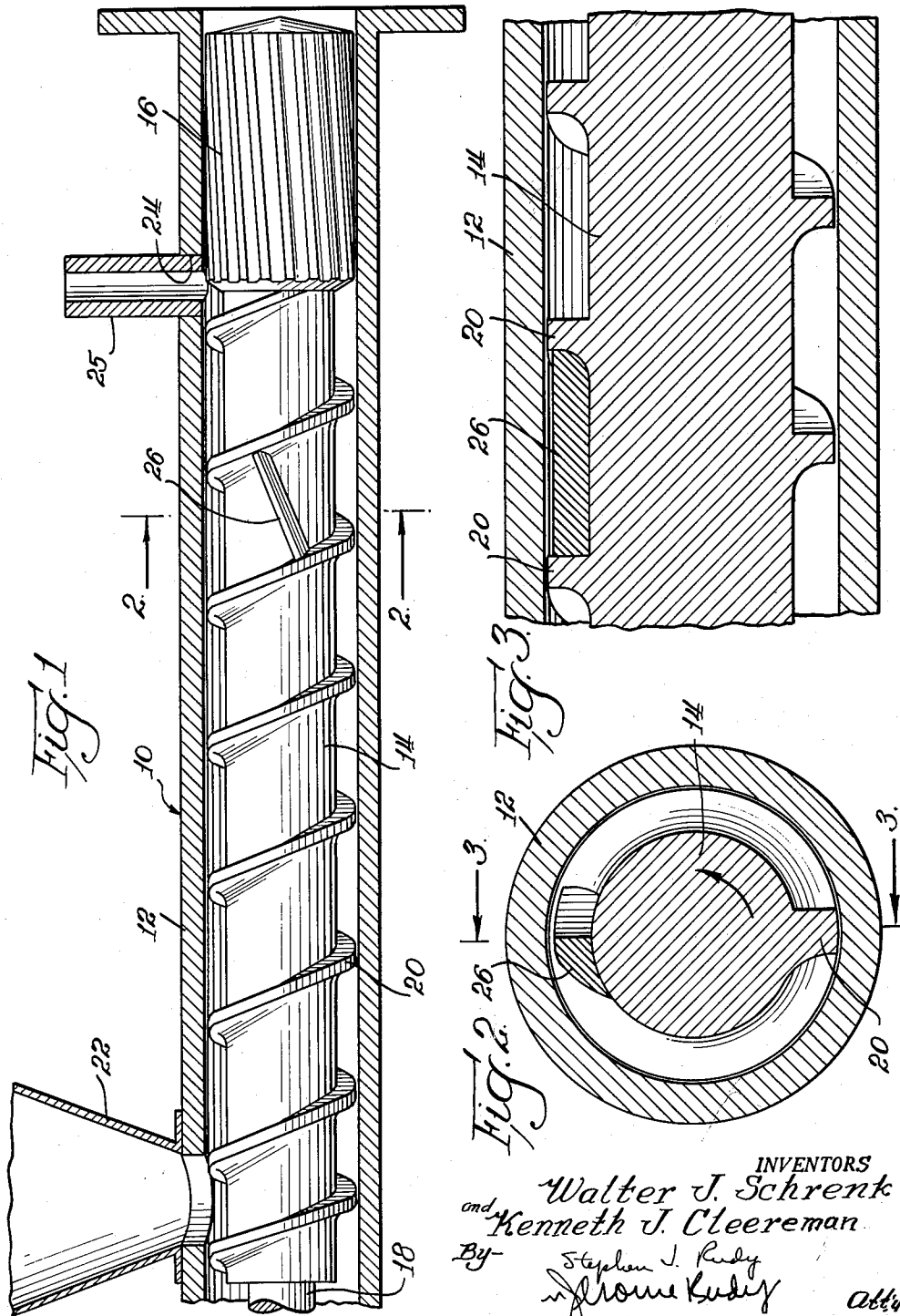
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W. J. SCHRENK ETAL

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BACKFLOW RESTRICTOR FOR EXTRUDERS

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INVENTORS
Walter J. Schrenk
and Kenneth J. Cleereman
By Stephen J. Rudy
Attorney

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BACKFLOW RESTRICTOR FOR EXTRUDERS
Walter J. Schrenk, Bay City, and Kenneth J. Cleereman,
Midland, Mich., assignors to The Dow Chemical Com-
pany, Midland, Mich., a corporation of Delaware
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This invention relates to a backflow restrictor for ex-
truders.

Gaseous, or liquid additives are often added to molten
polymers in an extruder, which additive frequently flows
backward out of the extruder feed opening resulting in
loss of additive, and possible reduction of polymer feed
rate.

The backflow restrictor of the present invention pro-
vides a simple solution to the problem of preventing back-
flow of additive through an extruder. Briefly, the inven-
tion comprises the use of a restrictor which is inserted
across an extruder screw flight at a point where the poly-
mer is molten. The restrictor effectively reduces the
flight depth for a small distance, which restricts backflow
of the additive, while avoiding excessive restriction of
forward pumping of the polymer. In such manner, a
simple and effective means is provided for solving the
problem of backflow in an extruder.

The main object of this invention is to provide a back-
flow restrictor for an extruder.

A more specific object is to provide a backflow res-
trictor for an extruder which will prevent backflow of
additive fed into the extruder.

Another object is to provide a backflow restrictor for
an extruder, which restrictor is of simple design and
highly effective in use.

These and further objects and features of the invention
will become more apparent from the following descrip-
tion and accompanying drawing wherein:

FIG. 1 is a partial section view illustrating an extruder
having a restrictor in accordance with the present inven-
tion:

FIG. 2 is an enlarged section view generally as seen
from line 2-2 in FIG. 1; and

FIG. 3 is a section view as seen from line 3-3 in
FIG. 2.

Referring now to the drawing, the numeral 10 identifies
an extruder assemblage including a cylindrical extruder
barrel, or housing 12, and a rotatable screw 14. The
discharge end of the screw is provided with a mixing
means 16, while the opposite end of the screw is provided
with a shaft 18 for connection to a power means (not
shown) for rotation of the screw. The screw 14 has a
spiral thread 20 upon its periphery, the outer diameter
of which forms a sliding fit within the extruder housing
12. A hopper 22 is arranged upon the extruder barrel
12 toward the rearward end, whereby material may be
fed into the barrel. An inlet port 24, having a feed tube
25, is located in the extruder barrel 12 toward the dis-
charge end, and in the same vertical plane as that of
the hopper, which port may be used for admitting addi-
tives to the extruder barrel.

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A backflow restrictor, according to the principles of
the invention, comprises a rib, or throttling lug 26, which
is arranged to extend substantially normal to the side
walls of adjacent screw threads as shown. Lug 26 may
be secured in position by welding, screws, etc. The
height of the lug is less than the height of the screw
thread so that the upper edge of the lug is located a short
distance from the inner wall of the barrel 12. A lead
side of the lug 26 is preferably curved, while the trailing
side is normal to the screw body, as best seen in FIG. 2.

In one operative embodiment in which the bore of the
barrel 12 was 1¼", the distance from the center of the
screw 14 to the peripheral edge of the restrictor, was
0.605" while the distance, in an axial direction, from the
mid-region of the restrictor 26 to the port 24, was ap-
proximately 1½". In this particular extruder assemblage,
1 lb. per hour of methyl chloride was added to 10 lbs. per
hour of polystyrene, and no backflow of methyl chloride
occurred during prolonged operation.

From the above description it will be seen that a back-
flow restrictor made in accordance with the principles of
the invention, will satisfy the objectives set forth herein
before.

The foregoing description has been given in detail with-
out thought of limitation since the inventive principles
involved are capable of assuming other forms without
departing from the spirit of the invention or the scope
of the following claims.

What is claimed is:

1. In an extruder assembly including a feed screw hav-
ing a spiral thread and an additive inlet port near the
discharge end of the extruder, a backflow restrictor com-
prising, a rib extending between the side walls of adjacent
screw threads said rib being arranged so that the lead end
thereof is upstream from said inlet port, the outermost
surface of said rib being arranged a uniform distance
from the axis of said screw and at a slightly less distance
than that of the outer periphery of the spiral thread, and
being further arranged so that the longitudinal axis of said
rib is substantially normal to the walls between adjacent
screw threads at the point of juncture therewith.

2. In an extruder assembly having a feed screw back-
flow restrictor according to claim 1, wherein said rib has
a curved surface on the lead side of the rib.

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